III. CLAIMS

1-14. (Cancelled)

15. (New) A method for processing directed sound in an acoustic virtual environment in an electronic device, said acoustic virtual environment comprising at least one sound source, the method comprising:

defining a reference direction and a set of selected directions for the at least one sound source, each selected direction differing from said reference direction,

establishing a direction dependent filtering arrangement having at least one parameter disposed to at least partly determine a filtering effect of the direction dependent filtering arrangement, said at least one parameter enabling the direction dependent filtering arrangement to model how sound emitted by said at least one sound source sounds when listened to from a direction that deviates from said reference direction,

for each selected direction defining at least one value of said at least one parameter, and

filtering a signal representing the sound emitted by said at least one sound source with the direction dependent filtering arrangement.

16. (New) A method according to claim 15, wherein establishing the direction dependent filtering arrangement comprises associating a filter with each selected direction so that a filtering effect of a filter relating to each selected direction depends on the at least one value of said at least one parameter relating to the selected direction in question.

17. (New) A method according to claim 15, wherein the at least one value of said at least one parameter relating to a certain selected direction determines an amplification factor that is disposed to determine amplification of the signal representing the sound emitted by said at least one sound source when listened to from a direction corresponding with the selected direction in question.

18. (New) A method according to claim 15, wherein the at least one value of said at least one parameter relating to a certain selected direction determine separate amplification factors that are disposed to determine amplifications for different frequencies of the signal representing the sound emitted by said at least one sound source when listened from a direction corresponding with the selected direction in question.

19. (New) A method according to claim 15, wherein the values of said at least one parameter relating to a certain selected direction are the coefficients [b_0 b_1 a_1 b_2 a_2 ...] of the quotient expression

$$H(z) = \frac{Y(z)}{X(z)} = \frac{\sum_{k=o}^{M} b_k z^{-k}}{1 + \sum_{k=1}^{N} a_k z^{-k}}$$

that is disposed to determine a Z-transform of a transfer function of the direction dependent filtering arrangement, X representing the z-transform of the signal representing the sound emitted by said at least one sound source, Y representing the Z-transform of a signal representing the sound listened to from a direction corresponding with the selected direction in question, M and N being upper limits for defining accuracy at which it is desired to define the transfer function, z representing a Z-transform variable, and k being a summation index.

20. (New) A method according to claim 16, comprising interpolation between said filters in order to model how the sound emitted by said at least one sound source sounds when listened to from a direction that differs from the reference direction and each selected direction.

21. (New) A method according to claim 15, comprising:

generating in a transmitting device said acoustic virtual environment comprising said at least one sound source;

performing in the transmitting device, defining the reference direction and the set of selected directions, establishing the direction dependent filtering arrangement having said at least one parameter, and the defining said at least one value of said at least one parameter for each selected direction,

transmitting from said transmitting device to a receiving device information about the direction dependent filtering arrangement,

receiving in the receiving device said information about the direction dependent filtering arrangement,

reconstructing in the receiving device the direction dependent filtering arrangement on the basis of said information, and

performing in the receiving device, filtering the signal representing the sound emitted by the at least one sound source with the direction dependent filtering arrangement.

22. (New) A method according to claim 21, wherein the transmitting device transmits to the receiving device information about the direction dependent filtering arrangement as a part of a data stream according to the MPEG-4 standard.

23. (New) A method according to claim 15, wherein at least one sound source is a real sound source.

24. (New) A method according to claim 15, wherein at least one sound source is a reflection.

25. (New) A system for processing directed sound in an acoustic virtual environment in an electronic device, said acoustic virtual environment comprising at least one sound source, the system comprising:

means for defining a reference direction and a set of selected directions for the at least one sound source, each selected direction differing from said reference direction;

- a direction dependent filtering arrangement disposed to filter a signal representing sound emitted by said at least one sound source, the direction dependent filtering arrangement having at least one parameter disposed to at least partly determine a filtering effect of the direction dependent filtering arrangement, said at least one parameter enabling the direction dependent filtering arrangement to model how the sound emitted by said at least one sound source sounds when listened to from a direction that deviates from said reference direction; and

means for associating a value (values) of said at least one parameter with each selected direction.

26. (New) A system according to claim 25, comprising a transmitting device and a receiving device and means for realizing an electrical communication between the transmitting device and the receiving device.

27. (New) A system according to claim 26, comprising multiplexing means in the transmitting device for adding data describing the direction dependent filtering arrangement to a data stream according to the MPEG-4 standard, and de-multiplexing means in the receiving device for extracting said data describing the direction dependent filtering arrangement from the data stream according to the MPEG-4 standard.

28. (New) A system according to claim 26, comprising multiplexing means in the transmitting device for adding data describing the direction dependent filtering arrangement to a data stream according to the extended VRML97 standard, and de-multiplexing means in the receiving device for extracting said data describing the direction dependent filtering arrangement from the data stream according to the extended VRML97 standard.

IV. REMARKS

1. Claims 1-14 are cancelled without prejudice. Claims 15-28 are new. Support for the claims can be found in the specification at for example, page 5, lines 6-26. The specification is amended to replace the Summary section.

2. Claims 15-28 are not anticipated by Jot (GB2305092A) under 35 U.S.C. § 102(b).

Claim 15 recites defining a reference direction and a set of selected directions. Claim 15 also recites establishing a direction dependent filtering arrangement that has at least one parameter disposed to partly determine a filtering effect at the direction dependent filtering arrangement. The at least one parameter enables the direction dependent filtering arrangement to model how sound emitted by the at least one sound source sounds, when listened to from a direction that deviates from the reference direction. Claim 15 also recites that a value of the at least one parameter is defined for each selected direction. These features are neither disclosed nor suggested by Jot.

Jot is directed to a method and a system for simulation of acoustical quality produced by a virtual sound source and for localizing of this virtual sound source with respect to one or more listeners.

Jot does not teach defining a reference direction and a set of selected directions as claimed by Applicant. Jot also does not disclose a direction dependent filtering arrangement that has at least one parameter disposed to at least partly determine a filtering effect (a transfer function, amplification, etc) as is claimed by Applicant.

Referring to on page 21, lines 16-19 Jot, is stated that "from the orientation and the directivity of the sources defined in the step 100, using the control box 44, the spectra "FACE" and "OMNI" are computed in the step 142."(page 21, lines 16-19). This means that when a system is changed from a state modelling situation, in which the sound source is listened to from a first direction, to a state modelling situation in which the sound source is listened from a second direction, the FACE-spectrum has to be recomputed. Jot does not disclose a solution in which the spectra "FACE" and "OMNI" are obtained with the aid of a filtering arrangement by giving to parameters of said filtering arrangement such values that correspond with the orientation and the directivity of the sources.

Applicant's claimed solution makes possible a system that can be very rapidly changed to from a state modelling situation in which the sound source is listened to from a first direction to a state modelling situation in which the sound source is listened to from a second direction. Only the values of the parameters have to be changed from values corresponding with the first direction to values corresponding with the second direction.

Additionally, Jot does not disclose a direction dependent filtering arrangement that is configured with one or more parameters to model how sound emitted by the at least one sound source sounds when listened to from a direction that deviates from a certain reference direction. Instead, Jot teaches that when orientation and directivity of sources are defined, FACE- and OMNI-spectrum are computed. Jot does not teach to compute these spectrums with a direction dependent filtering arrangement

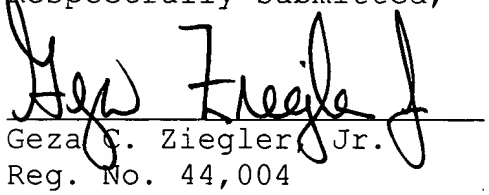
that is configured with one or more parameters to correspond with a desired listening direction as claimed by Applicant.

Thus, since Jot does not disclose or suggest each feature of Applicant's claims, the claims cannot be anticipated. Claim 25 recites similar subject matter and is equally not anticipated. Claims 16-24 and 26-28 should be allowable at least by reason of their respective dependencies.

For all of the foregoing reasons, it is respectfully submitted that all of the claims now present in the application are clearly novel and patentable over the prior art of record, and are in proper form for allowance. Accordingly, favorable reconsideration and allowance is respectfully requested. Should any unresolved issues remain, the Examiner is invited to call Applicants' attorney at the telephone number indicated below.

The Commissioner is hereby authorized to charge payment for any fees associated with this communication or credit any over payment to Deposit Account No. 16-1350.

Respectfully submitted,



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Geza C. Ziegler, Jr.
Reg. No. 44,004
Date

Perman & Green, LLP
425 Post Road
Fairfield, CT 06824
(203) 259-1800 Ext. 134
Customer No.: 2512

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